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IS : 983 - 1980

Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ALKALINE MILLING

(First Revision)

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TO
IS : 983 - 1980 METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ALKALINE MILLING

(First Revision)

(*Clause* **4.3**, *line* 5) — Insert '(*see also* Appendix A of IS : 10251-1982§)' at the end.

(*Page* 4, *foot-notes*) — Insert the following foot-note:

'§General principles of testing textiles for colour fastness tests.'

(*Clause* **5.1**) — Substitute the following for the existing clause:

'**5.1 Soap Soda Solution** — The soap solution shall contain 50 g/l soap and 10 g/l anhydrous sodium carbonate. The soap shall conform to the requirements as given below with moisture regain not more than 5 percent. The soap shall be free from optical brightening agents.

Sl No.	*Characteristic*	*Requirement*
i)	Free alkali calculated as Na_2CO_3, *Max*	0·3 percent
ii)	Free alkali calculated as NaOH, *Max*	0·1 percent
iii)	Combined fatty acids calculated as Na salts, *Min*	85 percent
iv)	Titre of mixed fatty acids prepared from the soap, *Max*	39°C
v)	Iodine value of fatty acids, *Max*	50

(*Page* 5, *foot-note marked with* '†' *mark*) — Delete.

(*Clause* **7.6**, *line* 2) — Substitute 'IS : 768-1982*' *for* 'IS : 768-1956*'.

(*Clause* **7.6**, *line* 3) — Substitute 'IS : 769-1982†' *for* 'IS : 769-1956†'.

(*Clause* **7.6**, *Note*) — Substitute 'NOTE 1' for the existing 'NOTE' and insert 'NOTE 2' after 'NOTE 1' as follows:

'NOTE 2 — In cases of doubt in the colour fastness ratings as assessed by an observer, the assessment should be done by at least three observers and the overall average rating should be reported.'

(*Page* 7, *clause* **A-1**, *line* 3) — Substitute '($Na_2SO_4\ 10H_2O$)' *for* '($Na_2SO_4O10H_2O$)'.

(*Page* 7, *foot-notes*) — Substitute the following for the existing foot-notes:

'*Method for evaluating change in colour (*first revision*).

†Method for evaluating staining (*first revision*).'

(TDC 5)

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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ALKALINE MILLING

(First Revision)

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(*Continued on page* 2)

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Indian Standard

METHOD FOR DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS TO ALKALINE MILLING

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 September 1980, after the draft finalized by the Chemical Methods of Tests Sectional Committee had been approved by the Textile Division Council.

0.2 Colour fastness of textile materials is of considerable importance to the consumer. The fastness depends not only upon the nature and depth of shade of the dyestuff used but also upon the nature of the fibre and the method of dyeing or printing employed. The same colouring matter, when used in dyeing or printing different fibres or when applied by different methods upon the same fibre, may give vastly different results. Formulation of standard methods of test for determining colour fastness of textile materials to different agencies and processes likely to effect change in colour is, therefore, necessary.

0.3 This standard was originally published in 1958, and is now being revised to align it with the corresponding ISO standard ISO 105-E 12-1978 (E) Textiles — Tests for colour fastness E 12 colour fastness to alkaline milling. As the quality of soap powder prescribed in the standard was not readily available in the market, a reference to IS : 2887-1974* has been made in this revision.

1. SCOPE

1.1 This standard prescribes a method for the determination of colour fastness of textile materials to the action of soap and sodium carbonate used in alkaline milling.

1.2 The method is applicable to materials containing wool.

---

*Specification for laundry soap powders (*first revision*).

2. PRINCIPLE

2.1 A specimen of textile in contact with adjacent fabrics is milled in a jar containing stainless steel balls and solution of soap and sodium carbonate. The severity of the action is standardized by means of a test control specimen milled separately in the same way. The ratings for change in colour of the test specimen and staining of the two pieces of adjacent fabrics are assessed with the Grey Scales.

3. SAMPLING

3.1 The sample of fibres, yarns or fabrics shall be so drawn as to be the representative of the lot. Sample drawn in accordance with the procedure laid down in the material specifications or as agreed to between the buyer and the seller shall be taken as representative of the lot.

NOTE — Reference to IS : 4952-1968* and IS : 5463-1969† may be made for drawing samples of cotton fibres and fabrics.

4. APPARATUS

4.1 A suitable mechanical washing device conforming to the following requirements shall be used:

a) A water-bath containing a rotor with which containers (of glass or of stainless steel) of 500 ml capacity are rotated at a speed of 40 ± 2 rev/min.

b) Means of thermostatically controlling the temperature of the water-bath so as to maintain the temperature of test solution in the containers at 40 ± 2°C.

NOTE — The Wash-Wheel sponsored by the Society of Dyers and Colourists or the Launderometer sponsored by the American Association of Textile Chemicals and Colourists or the Launderometer‡ developed by the Silk and Art Silk Mills Industry's Research Association or any other mechanical apparatus giving identical results may be used for this test.

4.2 Stainless Steel Balls — Approximately 6 mm in diameter.

4.3 Two Adjacent Fabrics — Each measuring 10 × 4 cm, one piece made of the same kind of fibre as that of the textile to be tested or that predominating in the case of blends, the second piece made of the fibre as indicated in the following table or in the case of blends of the kind of fibre second in order of predominance:

---

*Methods for sampling of cotton bales, slivers and rovings.

†Methods for sampling of cotton fabrics for chemical tests.

‡Available with the Silk and Art Silk Mills Industry's Research Association, Dr A. B. Road, Worli, Bombay 400025.

If first piece is	*Second piece to be*
Cotton	Wool
Wool	Cotton
Linen	Wool
Viscose	Wool
Acetate	Wool
Polyamide	Wool
Polyester	Wool
Acrylic	Wool

4.4 Test Control — A dyeing of 3 percent acid blue 7 (Colour Index, 3rd Edition) on wool cloth shall be used as a test control to ensure that the test is carried out correctly.

NOTE — For preparation of the dyeing, *see* Appendix A.

4.5 Grey Scales — For assessing change in colour and staining.

5. REAGENTS

5.0 Quality of Reagents — Unless specified otherwise pure chemicals shall be employed in the tests and distilled water (*see* IS : 1070-1977[*]) shall be used where water is used as a reagent.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

5.1 Soap Soda Solution — The soap soda solution shall contain 50 g/l soap and 10 g/l anhydrous sodium carbonate. The soap shall conform to the requirements of Type 1 of IS : 2387-1974[†] (*see* Note) with moisture regain not more than 5 percent and titre of fatty acids not more than 25°C. The soap shall be free from optical brightening agents.

NOTE — The essential requirements of soap are reproduced below:

Sl No.	*Characteristic*	*Requirement for Soap Type 1 (Pure)*
i)	Total fatty matter, percent by mass, *Min*	80·0
ii)	Rosin acids, percent by mass of total fatty matter, *Max*	3·0
iii)	Unsaponified fatty matter, percent by mass, *Max*	0·5
iv)	Free caustic alkali, percent by mass, *Max*	0·05
v)	Matter insoluble in alcohol, percent by mass, *Max*	2·0
vi)	Glycerol, percent by mass, *Max*	1·5
vii)	Hexabromide test (on fatty acids)	Negative

---

[*] Specification for water for general laboratory use (*second revision*).

[†] Specification for laundry soap powders (*first revision*).

6. PREPARATION OF TEST SPECIMENS

6.1 If the textile to be tested is a fabric, place a specimen of 10 × 4 cm between the two adjacent fabrics (*see* **4.3**) and sew along all four sides to form a composite specimen.

6.2 If the textile to be tested is a yarn, knit it into the fabric and treat it as in clause **6.1**, or form a layer of parallel lengths of it between the two pieces of adjacent fabrics (*see* **4.3**), the amount of yarn taken being approximately equal to half of the combined mass of the adjacent fabrics. Sew along all four sides to hold the yarn in place and to form a composite specimen.

6.3 If the textile to be tested is loose fibre, comb and compress an amount approximately equal to half of the combined mass of the adjacent fabrics (*see* **4.3**) into a sheet 10 × 4 cm. Place the sheet between the two adjacent fabrics and sew along all four sides to hold the fibre in place and to form a composite specimen. If necessary, sew along the two diagonals also.

6.4 Prepare a composite test control specimen from the test control (*see* **4.4**) as given in **6.1**.

6.5 Prepare at least three composite test specimens.

7. PROCEDURE

7.1 Carry out the operations described in **7.2** to **7.4** inclusive with the composite specimen and the composite test-control specimen, in parallel in separate baths.

7.2 Put the composite specimen and the composite test-control specimen in separate containers in the machine (*see* **4.1**), each with three times its own mass of the milling solution (*see* **4.4**) and 50 of the stainless steel balls. Run the machine for 2 hours at 40 ± 2°C.

7.3 Add sufficient distilled water at 40 ± 2°C to give a liquor ratio of 100 : 1 and run the machine for an additional 10 minutes.

7.4 Remove the composite specimens, rinse twice in cold distilled water, then rinse for 10 min in cold running water. Open out the composite specimen by breaking the stitching on all but one of the shorter sides and dry it by hanging it in air at a temperature not exceeding 60°C with the three parts in contact only at the remaining line of the stitching.

7.5 Assess the change in colour of the test control and the staining of adjacent fabrics with the appropriate grey scales. If the change in colour is not equal to rating 3 or the appropriate Grey Scales the test has n ot been carried out correctly, and the operations described in **7.2** to **7.4** should be repeated with a fresh composite specimen and a fresh composite test-control specimen.

7.6 Evaluate the change in colour of the treated test specimen by the method prescribed in IS : 768-1956* and the degree of staining of the two pieces of adjacent fabrics by the method prescribed in IS : 769-1956†.

NOTE — Treated test specimens and the two pieces of adjacent fabrics should be allowed to cool after drying and to regain their normal moisture content before evaluation.

7.7 Repeat the test with the remaining composite specimens.

8. REPORT

8.1 The report shall include the following information:

a) Type of material,
b) The numerical ratings for change in colour of the test piece, and
c) The numerical ratings for staining of the two adjacent fabrics.

APPENDIX A

(*Note* under *Clause* 4.4)

PREPARATION OF DYEING

A-1. Wet out a sufficiently large-sized piece of wool cloth and enter it at 40°C into a dye bath containing 3 percent acid blue 7 (Colour Index, 3rd edition), 10 percent sodium sulphate crystals ($Na_2SO_4O10H_2O$) and 3 percent sulphuric acid (sp gr 1·84), all percentages being calculated on the mass of the piece of wool cloth and using a liquor to material ratio of 40 : 1.

A-2. Bring the dyebath to the boil in 30 minutes and boil for 45 minutes. Remove the piece, rinse it well and dry.

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*Method for evaluating change in colour.

†Method for evaluating staining.

INDIAN STANDARDS
ON
DETERMINATION OF COLOUR FASTNESS OF TEXTILE MATERIALS

IS :

686-1957	Daylight
687-1979	Washing : Test 1 (*second revision*)
688-1956	Organic solvents
689-1956	Hot pressing
690-1956	Sea water
762-1956	Hypochlorite bleaching
763-1956	Peroxide bleaching
764-1979	Washing Test 3 (*second revision*)
765-1979	Washing Test 4 (*second revision*)
766-1956	Rubbing
767-1956	Water
865-1958	Decatizing
967-1956	Acid chlorination
968-1956	Acid spotting
969-1956	Cross-dyeing : Wool
971-1956	Perspiration
972-1956	Potting
973-1956	Soda boiling
974-1966	Steaming (*first revision*)
975-1956	Sublimation
976-1956	Water spotting
977-1956	Alkali spotting
978-1956	Carbonizing with sulphuric acid
979-1957	Mercerizing
981-1957	Acid milling
982-1958	Carbonizing with aluminium chloride
983-1980	Method for determination of colour fastness of textile materials to alkaline milling (*first revision*)
984-1962	Washing in the presence of sodium hypochlorite
987-1958	Bleaching with sodium chlorite
1690-1960	Nitrogen oxides
1807-1961	Formaldehyde
2454-1967	Artificial light (xenon lamp)
3361-1979	Washing Test 2 (*first revision*)
3417-1979	Washing Test 5 (*first revision*)
3425-1966	Acid felting : Severe
3426-1966	Rubbing with organic solvents
3857-1966	Acid felting : Mild
4389-1967	Hot water
4635 (Part I)-1968	Vulcanizing : Part I With hot air
4635 (Part II)-1968	Vulcanizing : Part II With sulphur monochloride
4635 (Part III)-1968	Vulcanizing : Part III With open steam
4636-1968	Dry-heat treatments
4637-1968	Steam under pressure
4802-1968	Dry-cleaning
4803-1968	Chlorinated water
5951-1970	Weathering by outdoor exposure
6152-1971	Weathering by xenon arc lamp

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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